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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/800,716	03/16/2004	Katsumasa Hijikata	2004-0416A	1033
513	7590	04/18/2006	EXAMINER	
WENDEROTH, LIND & PONACK, L.L.P.			SHINGLETON, MICHAEL B	
2033 K STREET N. W.				
SUITE 800			ART UNIT	
WASHINGTON, DC 20006-1021			PAPER NUMBER	
			2817	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/800,716

Applicant(s)

HIJIKATA ET AL.

Examiner

Michael B. Shingleton

Art Unit

2817

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 03/06 one sheet.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

*Michael B. Shingleton*  
MICHAEL B. SHINGLETON  
PRIMARY EXAMINER  
GROUP 1 PART 1 UNIT 17

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 5 and 12-15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Lind 3,541,451 (Lind).

Figure 1a and the relevant text of Lind discloses a variable gain amplifier arrangement having a down converter mixer 12 whose gain varies via a automatic gain control signal “AGC”. The arrangement of Lind also clearly includes an RF signal connected to a first terminal and a local oscillator signal connected to a second terminal. The output of the mixer and the associated output from the variable gain amplifier forms a signal generator whose output is connected to a variable capacitor arrangement that includes variable capacitor elements 37 and 45 (See column 3 around line 65). The ground buss 33 can be considered to be a “AC ground terminal”. There is a control circuit that supplies the AFC and AGC signals that is not only operable to control but in fact does control the signal generator and the capacitance of the variable capacitor, however, Lind does not show this circuitry in the drawing Figures. It never-the-less must be present for some circuitry is required to form the two electrical control signals AFC and AGC. Note that the RF signal is indirectly connected to the first terminal of the variable gain amplifier formed by transistor Q1. Claim 12 recites the functional language “wherein said control circuit controls the variable capacitor so that the cutoff frequency or resonance frequency of the signal generator becomes constant”. Because the unshown control circuit forms both the AFC signal and the AGC signal this control circuit is fully capable of providing the function recited by claim 12 and as such Lind also anticipates claim 12 (See *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). Lind is clearly directed to the use in the conventional FM broadcasting band. While Lind does not say what frequencies make up the conventional FM broadcasting band, it is conventionally known that the conventional FM broadcasting band ranges from 88.5 to 108 MHz. Thus the RF source of Lind has a signal band equal to or larger than 100MHz.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lind 3,541,451 (Lind).

From the reading of Applicant's specification it is clear that the various mixer structures disclosed and claimed are conventional and that the invention lies in the use of a variable capacitor connected to the output of these conventional mixers. In any case, a mixer that has a "variable resistor at an output load part" is a conventional art recognized equivalent mixer structure. Also a mixer that has a "variable inductor at an output load part" is a conventional art recognized equivalent mixer structure. Furthermore, a "single balanced mixer" or "double balanced mixer" is also another well known conventional art recognized equivalent mixer structure. Also a source ground amplifier that makes up the variable gain mixer defines yet another art well known art recognized equivalent mixer structure. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the conventional mixer 12 of Lind with either a mixer that has a "variable resistor at an output load part" or a mixer that has a "variable inductor at an output load part" or a mixer that is a "single balanced mixer" or a mixer that is a "double balanced mixer" or a mixer that includes a variable gain amplifier whose source is grounded because as the Lind reference is silent on the exact structure that makes up the mixer one of ordinary skill in the art would have been motivated to use any art-recognized equivalent mixer structure such as the conventional mixer that has a "variable resistor at an output load part" or the conventional mixer that has a "variable inductor at an output load part" or the conventional mixer that is a "single balanced mixer" or the conventional mixer that is a "double balanced mixer" or the conventional mixer that includes a variable gain amplifier whose source is grounded.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lind 3,541,451 (Lind) in view of El-Hamamsy 5,463,285 (El-Hamamsy).

The reasoning as applied above to claims 2, 3, 6, and 7 and the following: As noted above the variable capacitor structures used in Lind are voltage sensitive capacitors 37 and 45. Lind fails to show the use of a variable capacitor that is constituted by a circuit that has at least two capacitors placed in

parallel between a first and a second terminal and has at least one switch connected to the an end of one of the capacitors. One well-known art recognized equivalent form of variable capacitor is the capacitor structure that is constituted by a circuit that has at least two capacitors placed in parallel between a first and a second terminal and has at least one switch connected to the an end of one of the capacitors. The switching of the switches is what causes a variance in the capacitance. El-Hamamsy shows such a variable capacitor structure in Figure 3 as being an art recognized equivalent structure to a variable capacitor known in the art. Therefore, because these two variable capacitors were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute the capacitor structure that is constituted by a circuit that has at least two capacitors placed in parallel between a first and a second terminal and has at least one switch connected to the an end of one of the capacitors for the voltage sensitive capacitors 37 and 45. One of ordinary skill in the art would have been further motivated to make the substitution for the parallel connected capacitor structure allows for fully digital control of the capacitance values.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lind 3,541,451 (Lind) in view of Shenai 5,914,513 (Shenai).

The reasoning as applied above to claims 2, 3, 6, and 7 and the following: As noted above the variable capacitor structures used in Lind are voltage sensitive capacitors 37 and 45. Shenai discloses the same type of voltage variable capacitor arrangement as that of Lind but whereas Lind is silent on the exact structure that makes up the capacitors 37 and 45 of the two series connected capacitor arrangements (Note 37 and 39 as well as 45 and 46.) Shenai discloses the details of such an arrangement. Specifically Shenai shows a variable capacitor arrangement having a MOS device 14 whose gate terminal 42 is connected to a capacitor 12 via the oxide 40 and region 30, the gate is between the cathode K (third terminal) and the anode A (fourth terminal) and the capacitance between the third and fourth terminals is varied by a bias voltage supplied to the gate terminal of the MOS device (Note Column 5 around line 8 that states at least "[t]o provide variable capacitance, a control voltage is applied to the gate 42 of the MOS capacitor 14.").

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have replaced the voltage variable capacitor elements 37 and 45 of Lind with MOS based variable capacitance elements because as the Lind reference is silent on the exact structure of these MOS based variable capacitance elements one of ordinary skill in the art would have been motivated to use any art-recognized equivalent voltage variable capacitance elements such as the MOS based capacitance elements taught by Shenai.

Claim 10 rejected under 35 U.S.C. 103(a) as being unpatentable over Lind 3,541,451 (Lind) in view of JP06170368 whose inventor(s) is(are) "unknown" (Unknown).

The reasoning as applied above to claims 2, 3, 6 and 7 and the following: As noted above one conventional mixer is one that includes a variable resistor but the conventional mixer structure is silent on the details of the variable resistor structure. One well-known art recognized equivalent form of variable resistor is constituted by a circuit that has at least two resistors placed in parallel between a first and a second terminal and has at least one switch connected to the an end of one of the resistors. The switching of the switches is what causes a variance in the resistance. Unknown shows such a variable resistor structure in Figure 1 as being an art recognized equivalent structure to a variable resistor known in the art. Note elements like R4 and Tr4. Therefore, because these two variable resistors were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute the resistor structure that is constituted by a circuit that has at least two resistors placed in parallel between a first and a second terminal and has at least one switch connected to the an end of one of the resistors for the variable resistance that makes up the conventional mixer structure noted above. One of ordinary skill in the art would have been further motivated to make the substitution, for the parallel connected resistor structure allows for fully digital control of the resistance values.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lind 3,541,451 (Lind) in view of Ogawa 4,758,794 (Ogawa)

The reasoning as applied above to claims 2, 3, 6 and 7 and the following: As noted above one conventional mixer is one that includes a variable inductor but the conventional mixer structure is silent on the details of the variable inductor structure. One well-known art recognized equivalent form of variable inductor is constituted by a circuit that has at least two inductors placed in parallel between a first and a second terminal and has at least one switch connected to the an end of one of the inductors. The switching of the switches is what causes a variance in the inductance. Ogawa shows such a variable inductance structure in Figure 3 as being an art recognized equivalent structure to a variable inductance known in the art. Note elements like L1 and Q1. Therefore, because these two variable inductors were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute the inductance structure that is constituted by a circuit that has at least two inductors placed in parallel between a first and a second terminal and has at least one switch connected to

the an end of one of the inductors for the variable inductance that makes up the conventional mixer structure noted above. One of ordinary skill in the art would have been further motivated to make the substitution, for the parallel-connected inductor structure allows for fully digital control of the inductance values.

Applicant's arguments filed 02-06-2006 have been fully considered but they are not persuasive. Applicant states that the examiner recognizes that Lind does not disclose a control circuit. This is incorrect for there is a control circuit in Lind it is just not shown. As explained in the previous Office action there must be a circuit that provides the AGC signal and there must be a circuit that provides an AFC signal. The entire arrangement of these circuits can be called a single control circuit. Applicant has not provided any distinguishing structure of the control circuit, at least in the independent claims, over the prior art of record. Applicant recites that inherency may not be established by probabilities or possibilities. Such is not the case here. There is simply no way these AGC and AFC signals can be generated except through the use of a circuit. As such Lind clearly includes said circuit.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal, can be reached on (571)272-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306 and after July 15, 2005 the fax number will be 571-273-8300. Note that old fax number (703-872-9306) will be service until September 15, 2005.

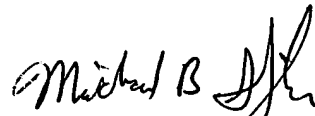
Art Unit: 2817

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MBS

September 28, 2005

April 15, 2006

A handwritten signature in black ink, appearing to read "Michael B Shingleton", with a stylized flourish at the end.

Michael B Shingleton  
Primary Examiner  
Group Art Unit 2817